

## **Chapter 2**

### **ALTERNATIVES INCLUDING THE PROPOSED ACTION**

#### **2.0 INTRODUCTION**

This Chapter describes the alternatives developed to address the issues, presents a comparison of the alternative features and a summary of the effects that would result from implementing each alternative. Section 2.2 presents these alternatives in detail.

#### **2.1 DEVELOPMENT OF ALTERNATIVES**

Alternatives present different management options in response to the purpose and need for the Proposed Action and address the relevant issues related to the Proposed Action. The effects analysis (Chapter 4) then describes the known or potential effects that would result if the alternatives were implemented.

Alternative A is the No Action Alternative. In this alternative, no approval would be issued for the POD. The existing situation would continue and no private, state or federal wells or associated infrastructure would be constructed. The POD proposed by Fidelity would be denied in its entirety and the landscape would not be altered. This alternative was included to provide the required basis for comparison with the action in Alternatives B and C.

Alternative B is the No Federal Action Alternative. The private and state wells and associated infrastructure would be developed in the project area. The BLM would not approve the federal wells or associated infrastructure. This alternative limits CBNG production and development to private and state land and minerals only in order to reduce the overall potential impacts to water, wildlife, and cultural resources. This alternative complies with the Montana Board of Oil and Gas Conservation Order No. 99-99.

Alternative C is the Proposed Action with Additional Mitigation. Fidelity's proposed project plan of development would be approved on the private, State and federal wells and construction of the associated infrastructure. Mitigating measures, not already part of the operator's proposal have been included as part of this alternative. This alternative was developed to analyze full implementation of Fidelity's proposal, while incorporating mitigating measures identified during project review that would avoid or reduce impacts to area cultural and natural resources. Alternative C is the agencies' preferred alternative.

#### **2.1.1 Alternatives considered but eliminated from Detailed Analysis**

##### Injection of Produced Water

In this suggested alternative, produced CBNG water would be injected either into depleted coal seams or sandstone formations capable of receiving produced water. This alternative would reduce the amount of produced water available for beneficial use or requiring surface disposal. The preferred water management option of water produced with CBNG is for beneficial use.

This alternative was suggested as a means to reduce the amount of water requiring treatment or surface disposal. The projected volumes of produced water from the project can be discharged directly into the Tongue River under Fidelity's MPDES permit or used for beneficial purposes; such as livestock and Spring Creek Mine use. The analysis in this EA shows no unresolved conflicts concerning the management of produced water; therefore, an analysis of a water injection alternative is not necessary to address water quality issues.

##### Water Treatment Alternative

This suggested method of managing produced water would require all produced water to be "treated" so that the water quality of receiving waters, soils and vegetation and existing beneficial uses would be protected. The quality of produced water varies from one coal to another and even geographically within a coal. The end use of the produced water and the authorizing permit determine the need for "treatment." The projected volumes of produced water from the project can be discharged directly into the Tongue River under Fidelity's MPDES permit or used for beneficial purposes. The analysis in this EA shows no unresolved conflicts concerning the management of produced water; therefore, an analysis of a separate water treatment alternative is not necessary to address water quality issues.

#### **2.2 DESCRIPTION OF THE ALTERNATIVES**

A comparison of the major components for the three alternatives is found in Table 2.5-1. A detailed description of each alternative follows.

##### **2.2.1 Alternative A—No Action**

There would not be any agency approved Coal Creek POD actions and none of the private, State or federal wells in the Coal Creek POD would be drilled, completed and produced; nor would any of the

associated production infrastructures that required agency approval be installed or constructed in the project area. The entire Fidelity Coal Creek POD would be denied.

### **2.2.2 Alternative B—No Federal Action**

The analysis of the No Federal Action Alternative includes the development and production of wells and infrastructure associated with the proposed fee and state wells (62 fee, 16 state and 1 existing state, 1 existing fee, see Appendix A) in the Coal Creek project area. No approval would be issued by BLM under this Alternative, for the CBNG wells and facilities associated with federal leases. Map 1.3-2 shows the project boundary, existing and proposed well locations, access roads, pipelines for water and gas, overhead and underground power lines, existing water management options and metering/compressor facilities.

The No Federal Action includes: the MBOGC would approve the drilling, completing and production of 78 fee wells, producing 2 existing wells and constructing associated infrastructure of access roads, flowlines, power lines, reclaiming disturbed areas, existing water management options and the use of meter and compressor facilities. These 78 wells would be drilled and completed in the Dietz, Carney and Monarch coal zones and the 2 existing wells are completed in the Monarch and Dietz coal zones. The average production life of the project wells is expected to be 10-20 years with final reclamation to be completed 2 to 3 years after plugging of the wells. Components of the proposed project are listed in Chapter 2, Table 2.5-1.

#### Drilling

Sixty-two CBNG fee wells would be drilled on 13 well sites and 16 CBNG state wells would be drilled on 4 well sites (see Appendix A), with 1 to 5 wells drilled on each well site at 160 acre site spacing (4 wells per coal seam per 160 acres). Separate vertical wells would be drilled into the Carney, Monarch and Dietz coal seams. In some areas, the Dietz splits into as many as 3 zones. Anticipated depth of the wells would be from approximately 300 to 1,200 feet deep. The drilling period is anticipated to last approximately 5 months.

Wells would be drilled by truck-mounted water well-type drilling rigs. The wells would be drilled using air and water for circulation and supplemented as needed by bentonite and sawdust or wood chips. Steel casing would be cemented in place from ground surface to the top of the target coal seam. The casing would be sized to accommodate a downhole pump to

lift water, but would typically be 7 inches in diameter. The well would then be drilled to the base of the target coal seam and under reamed to increase the exposed coal surface for production. Fresh water, including coal seam water, would be used in the drilling operations. CBNG production would occur by pumping groundwater from the coal seams, thereby reducing hydrostatic pressure and causing the methane to become desorbed from the coal surface and flow to the wells. All wells capable of commercial production would be completed and produced and the associated infrastructure would be constructed and installed.

At each drilling location, drilling wastes including cuttings, water and drilling muds would be placed into a reserve pit. Each pit would be approximately 6-feet wide, by 15-feet long, by 15-feet deep and fenced with a wire fence to keep out livestock and wildlife. After conclusion of drilling operations, fluids in the pits would be removed and either used for other drilling operations or disposed of properly and the pits backfilled after the remaining muds have dried. Wastes accumulated during drilling and completion operations would be contained on the well site and disposed at the Sheridan sanitary landfill. Chemical “porta-potties” would be located at active construction, drilling and battery sites.

#### Access

Vehicles would access the well sites by existing bladed roads, two track trails or across undisturbed rangeland along a designated route. Access would primarily use roughly 13.34 miles of existing and proposed two track roads and 5.3 miles of proposed improved roads. Pipeline corridors would also be used as temporary roads for access to well sites. Culverts would be installed at drainage crossings, if needed. Gravel or scoria needed for surfacing material would come from a pit owned and operated by Fidelity and permitted by MDEQ.

The road and pipeline routes are proposed as agreed to by the appropriate private surface owner or state agency. Where possible, whether proposed two-track road or existing, the roads would serve as a common corridor for the gas, electric, or water. The project map (1.3-2) shows the project boundary, existing and proposed wells, access roads, pipelines (water and gas), power lines, and the central gathering/metering/water processing facilities in the project area.

#### Well Sites

The 78 fee and state CBNG wells would be located at 17 sites, with 1 to 5 wells drilled at each site,

including the 2 existing wells. The alternative would be entirely located on private and State of Montana surface, private and state mineral lease. Approximately 1 acre at each well site would be disturbed by vehicle traffic, drilling and completion operations, reserve pits and temporary storage of equipment. The well sites would not require construction of a well pad; however blading may occur to level the drill rig.

Surface facilities at each producing well would consist of a wellhead and an insulated, fiberglass well head cover (approximately 5-foot square by 4-foot tall) and an electrical panel all enclosed in a three rail welded fence. The cover would be painted a color to blend with the surrounding area. The area within the fence would be graveled while the area outside the fence would be reclaimed after installation of production equipment. The existing Field compressor sites (Montana State 36 Battery (MAQP #3303) and Visborg 25 Battery (MAQP #3141)), the proposed field compressor sites (Rancholme 21 Battery (MAQP #3334) and Rancholme 29 Battery (MAQP #3335)), the existing sales battery (Symons Central Compressor Station (MAQP #3250-00)), and the current water management infrastructure would be utilized by this proposal.

#### Power Lines

Electricity would be provided to each battery site by a buried cable or an aerial line. Overhead electricity would be brought into the project area by existing lines to the north. Overhead power lines would be constructed according to APLIC (Avian Power Line Interaction Committee-1996) guidelines. Buried electrical cables would tie into the aerial power lines at a service tap which typically would serve up to three wells. Buried power lines would be installed parallel to an access road or following the most direct route from a power pole to the well site. Estimates to the total amount of overhead and buried electrical line are: 12.35 miles of overhead power lines (1.52 miles State; 7.86 miles Private), 8.46 miles of underground power lines (1.30 miles State; 7.16 miles Private), and 1.35 miles of underground high voltage power line (0 miles State; 1.35 miles Private). Approximately 1.8 miles of overhead power line parallel the County road which runs along the north edge of the project area.

#### Flowlines

A plastic flowline to carry gas would be buried from each well to a battery site. Approximately 11.74 miles of this line would be combined with water flowlines in the same trench. One plastic flowline

would be buried to carry produced water from all wells at the well site to the discharge point. When feasible, flowline routes would parallel and be located adjacent to existing or proposed roads and trails to the battery or water storage/discharge point. Areas disturbed for flowline installation would be reclaimed.

#### Produced Water

Water produced with CBNG would be made available for beneficial uses or discharged into the Tongue River in accordance with Fidelity's existing MPDES permit (MT-0030457). Produced water would be transported through buried plastic flowlines from each well site to the following existing facilities: (1) discharged to the Tongue River using Fidelity's existing MDEQ discharge permit MT-0030457; (2) beneficially used for industrial uses (dust suppression) in the Spring Creek Coal mine; (3) beneficially used by Fidelity for CBNG drilling, construction, and dust suppression; (4) beneficially used for stock and wildlife; (5) stored in the existing off drainage impoundment 23-0299; (6) stored in off drainage impoundment 44-3490 which was authorized in the Badger Hills POD, but has not yet been constructed; or (7) during the irrigation season, applied to the managed irrigation areas which were authorized in the Badger Hills POD, but are not in use at this time.

The discharge points into the Tongue River are located near the main channel in areas with low channel gradients. Each outfall structure consists of a riprap pad surrounding the discharge pipe with a narrow riprap lined trench sloping into the channel area to prevent eroding the channel bank.

#### Battery Sites

Gas from the new wells would be transported from each well to existing and proposed field battery sites. The battery sites are the existing Montana State 36 and Visborg 25 Batteries and the proposed Rancholme 21 and Rancholme 29 Batteries.

#### Reclamation

Reclamation would occur in areas where surface disturbing activities have been completed or concurrently while other operations are occurring in the project area. Reclamation activities would be conducted in accordance with the State of Montana requirements and surface owner agreements. Typically, disturbed areas not needed for production operations would be recontoured to resemble the surrounding terrain, stored topsoil would be spread over the recontoured area, necessary erosion control measures would be installed, disturbed areas would

be seeded with a certified weed-seed free mix agreed upon with the surface owner and reclamation work would be completed within 1 year after a specific activity has been completed. Fidelity proposes to do the reseed in the spring of 2005. Final reclamation would be completed approximately 2 to 3 years following the end of gas production.

A detailed description of design features, construction practices and water management strategies associated with the No Federal Action alternative, can be found in the Master Surface Use Plan, Drilling Plan and Water Management Plan in the POD and individual APDs.

### **2.2.3 Alternative C—Proposed Action, with Additional Mitigation: Agency's Preferred Alternative**

Fidelity's proposed Coal Creek POD, which includes Master Drilling and Surface Use Plans, a Water Management Plan, a Cultural Resource Inventory Plan, a Wildlife Monitoring and Protection Plan, and other supporting information, is the proposed action alternative. The POD describes the project and best management practices designed to implement the project. The analysis of the Proposed Action Alternative includes the development and production of wells and infrastructure associated with the proposed federal, fee and state wells (132 federal, 62 fee, 16 state and 1 existing fee, 1 existing state, 2 existing federal; see Appendix A) in the Coal Creek project area. Map 1.3-2 shows the project boundary, existing and proposed well locations, access roads, pipelines for water and gas, overhead and underground power lines, existing water management options and metering/compressor facilities.

The Proposed Action includes the drilling, completing and production of 132 federal, 62 fee, and 16 state CBNG wells, producing 4 existing wells and constructing associated infrastructure of access roads, flowlines, power lines, reclaiming disturbed areas, existing water management options and the use of meter and compressor facilities. These 210 wells would be drilled and completed in the Dietz, Carney and Monarch coal zones, as well as the existing completed 4 wells. The average production life of the project wells is expected to be 10-20 years with final reclamation to be completed two to three years after plugging of the wells. Components of the proposed project are listed in Chapter 2, Table 2.5-1.

The Coal Creek POD has been modified from its original submittal to meet natural resource requirements identified by BLM. The original POD was modified as a result of the interdisciplinary

review and field visits. During field "on-site" visits, each of the proposed federal locations and areas of proposed surface disturbance were inspected to ensure that potential impacts to natural resources would be minimized. The specific changes identified for these areas were as follows:

- Access for a resource road through Section 19 was negotiated with Decker Coal Mine, placing the road on an existing mine road, thus reducing surface disturbance.
- The entire POD was organized to avoid sharp-tailed and sage grouse strutting grounds.
- Several proposed overhead powerlines were converted to underground lines to reduce avian interactions.
- Various corridors were relocated to existing two tracks to minimize disturbance.

### Drilling

One hundred thirty two CBNG federal wells would be drilled on 27 well sites, 62 CBNG fee wells would be drilled on 13 well sites and 16 CBNG state wells would be drilled on 4 well sites (see Appendix A), with 1 to 5 wells drilled on each well site at 160 acre site spacing (4 wells per coal seam per 160 acres). Separate vertical wells would be drilled into the Carney, Monarch and Dietz coal seams. In some areas, the Dietz splits into as many as three zones. Anticipated depth of the wells would be from approximately 300 to 1,200 feet deep. The drilling period is anticipated to last approximately 5 months. Drilling operations would be the same as described above in Alternative B, but would include all the federal, fee and state wells.

### Access

Vehicles would access the well sites by existing bladed roads, two track trails or across undisturbed rangeland along a designated route. Access would primarily use approximately 32.22 miles of existing and proposed two track trails (13.34 miles to access private & state, 18.88 miles to access federal wells) plus 5.3 miles of all weather, improved roads. Pipeline corridors would also be used as temporary roads for access to well sites. "Off-lease" roads on Federal surface would be authorized by a BLM issued right-of-way. There would be 3 culverts needed to construct the all weather roads (2-18 inch and 1-42 inch). These culverts would allow for the crossing of ephemeral drainages. Gravel or scoria needed for surfacing material would come from a pit owned and operated by Fidelity and permitted by MDEQ.

The road and pipeline routes are proposed as agreed to by the appropriate surface owner or surface management agency, State/BLM. Where possible, whether proposed two-track road or existing, the roads would serve as a common corridor for the gas, electric, or water. The project map (1.3-2) shows the project boundary, existing and proposed wells, access roads, pipelines (water and gas), power lines, and the central gathering/metering/water processing facilities in the project area.

#### Well Sites

The 210 federal, fee and state CBNG wells would be located at 44 sites (45 including an existing well site), with 1 to 5 wells drilled at each site. One existing federal well, 21M-3491, is located on a well site with no proposed additional wells on the location, increasing the federal well sites to 28. The 28 federal locations would be split, with 14 locations on private surface/federal mineral and 14 locations on BLM administered surface/federal mineral lease. The 13 fee locations would be entirely on private surface/private mineral lease and the 4 state locations would be on State of Montana surface/state mineral lease, which includes the 2 existing wells. Approximately 1 acre at each well site would be disturbed by vehicle traffic, drilling and completion operations, reserve pits and temporary storage of equipment. The well sites would not require construction of a well pad; however blading may occur to level the drill rig.

Surface facilities at each producing well would consist of a wellhead and an insulated, fiberglass well head cover (approximately 5-foot square by 4-foot tall) and an electrical panel all enclosed in a three rail welded fence. The cover would be painted a color to blend with the surrounding area. The area within the fence would be graveled while the area outside the fence would be reclaimed after installation of production equipment. The existing Field compressor sites (Montana State 36 Battery (MAQP #3303) and Visborg 25 Battery (MAQP #3141)), the proposed field compressor sites (Rancholme 21 Battery (MAQP #3334), Rancholme 28 Battery (MAQP #3337) and Rancholme 29 Battery (MAQP #3335)), the existing sales battery (Symons Central Compressor Station (MAQP #3250-00)), and the current water management infrastructure would be utilized by this proposal.

#### Power Lines

Electricity would be provided to each battery site by a buried cable or an aerial line. Overhead electricity would be brought into the project area by existing lines to the north. Overhead power lines would be

constructed according to APLIC guidelines. Buried electrical cables would tie into the aerial power lines at a service tap which typically would serve up to 3 wells. Buried power lines would be installed parallel to an access road or following the most direct route from a power pole to the well site. Estimates to the total amount of overhead and buried electrical line are: 12.35 miles of overhead power lines (2.97 miles Federal; 1.52 miles State; 7.86 miles Private), 14.67 miles of underground power lines (6.21 miles Federal; 1.30 miles State; 7.16 miles Private), and 3.16 miles of underground high voltage power line (1.81 miles Federal; 0 miles State; 1.35 miles Private). Approximately 1.8 miles of overhead power line parallel the County road which runs along the north edge of the project area.

A BLM issued right-of-way would be required for any “off-lease” overhead and buried power lines constructed and installed by Power River Energy Corporation on Federal surface (see Appendix D for a list of right-of-way locations).

#### Flowlines

A plastic flowline to carry gas would be buried from each well to a battery site. Approximately 33.08 miles (21.34 miles for federal, 11.74 miles for private & state) of this line would be combined with water flowlines in the same trench. One plastic flowline would be buried to carry produced water from all wells at the well site to the discharge point. When feasible, flowline routes would parallel and be located adjacent to existing or proposed roads and trails to the battery or water storage/discharge point. Areas disturbed for flowline installation would be reclaimed.

A BLM issued right-of-way would be required for any “off-lease” buried 12 and 16 inch steel gas pipelines installed by Bitter Creek Pipelines, LLC (see Appendix D for a list of right-of-way locations).

#### Produced Water

Water produced with CBNG would be made available for beneficial uses or discharged into the Tongue River in accordance with Fidelity’s existing MPDES permit (MT-0030457). Produced water would be managed in the same manner as described above in Alternative B.

#### Battery Sites

Gas from the new wells would be transported from each well to existing and proposed field battery sites. The battery sites are the existing Montana State 36 and Visborg 25 Batteries and the proposed

Rancholme 21, Rancholme 28 and Rancholme 29 Batteries.

#### Right-of-way

The right-of-way proposed to be issued to Fidelity for buried poly gas lines, buried poly water lines, 3-phase .48 kV buried power lines, and access roads would be a total of 21,922 feet long and 50 feet wide, consisting of approximately 25 acres. Approximately 10,765 feet of road would be upgraded to an all weather Resource Road, the rest of the roads would consist of existing and/or new 2-track roads. The upgrading of the road would include gravel scoria surfacing material from permitted scoria pits. The 4-inch gas and 3-inch water lines would be in one 18 to 36-inch wide, 5 to 8 feet deep trench. The buried .48 kV power line would be plowed in 24 inches deep in a trench 4 inches wide, alongside and 10 feet from the pipeline trench. The 12-inch poly water line would be buried 5 to 8 feet deep in a trench 18 to 36 inches wide and 15 feet from the Bitter Creek Pipeline LLC steel gas pipelines. The right-of-way would be granted under Section 28 of the Mineral Leasing Act of 1920, as amended (MLA) and the pipelines, power line, and access road would be constructed, used, maintained, and terminated in conformance with the company's Coal Creek Plan of Development. The right-of-way would be subject to cost recovery and rental and would be issued for a term of twenty years and be renewable.

The right-of-way proposed to be issued to Powder River Energy Corporation for 3-phase, 4-wire, 14.4/29.9 kV overhead and buried power lines would be a total of approximately 29,321 feet long and 70 feet wide, consisting of 47.12 acres. There would be 21,216 feet of overhead power line and 8,105 feet of underground line. This power line would serve Fidelity Exploration & Production Company's coal bed natural gas projects. The proposed 3-phase overhead electrical distribution power line would be constructed and installed using standard utility construction equipment. No surface disturbance in the form of blading or grading is anticipated. Approximately 106 Western Red Cedar or Douglas fir power poles ranging in height and class from 30-5 to 50-2 would be set in the earth at approximate intervals of 275 feet and at an approximate depth of 6 to 6½ feet. The related structures consist of three-phase wood pole framework with Raptor protection designed into the structure, consistent with APLIC standards. The proposed 3-phase underground electrical distribution power line would be constructed and installed using standard utility construction equipment. The underground power line would be installed using a trencher to lay the power

line at an approximate depth of 3.5 to 4 feet. Access would be by a County Road and new and existing two-track roads, some of which would be upgraded to a Resource Road by Fidelity. Actual construction would take approximately 4 weeks. The right-of-way would be granted pursuant Title V of the Federal Land Policy and Management Act of October 21, 1976 (FLPMA) and the power line would be constructed, used, maintained, and terminated in conformance with the company's application/plan of development. The right-of-way would be subject to cost recovery, but exempt from rental in accordance with 43 CFR 2803.1-2 (b)(1)(iii). It would be issued for a term of ninety-nine years and be renewable.

The right-of-way proposed to be issued to Bitter Creek Pipelines, LLC for buried 12-inch and 16-inch gas pipelines would be a total of 4,260 feet long and 50 feet wide, consisting of 4.89 acres, more or less. One gas line would be a 12-inch high pressure steel line, rated at 1480 PSI, MAOP and the other would be a 16-inch low pressure steel line, rated at 180 PSI, MAOP. The gas lines would be installed in separate trenches 24 inches wide at an approximate depth of 5 feet, with a minimum of 3 feet of coverage. The two trenches would be a minimum of 10 feet apart and would run parallel to and 15 feet from Fidelity's 10 inch poly water line. A wheel trencher/track hoe would be used for installation of the steel gas lines. Access would be by a new two-track road and Fidelity's upgraded Resource Road. The right-of-way would be granted under section 28 of the Mineral Leasing Act of 1920, as amended (MLA) and the pipeline would be constructed, used, maintained, and terminated in conformance with the company's application/plan of development. The right-of-way would be subject to cost recovery and rental and would be issued for a term of 30 years and be renewable.

The above rights-of-way would be subject to the stipulations in Appendix E. No temporary work areas would be required. The rights-of-way would be monitored for construction, use, and reclamation.

#### Reclamation

Reclamation would occur in areas where surface disturbing activities have been completed or concurrently while other operations are occurring in the project area. Reclamation activities would be conducted in accordance with the BLM and State of Montana requirements and surface owner agreements. Typically, disturbed areas not needed for production operations would be recontoured to resemble the surrounding terrain, stored topsoil would be spread over the recontoured area, necessary

erosion control measures would be installed, disturbed areas would be seeded with a certified weed-seed free mix agreed upon with the surface owner and reclamation work would be completed within 1 year after a specific activity has been completed. Fidelity proposes to do the reseeding in the spring of 2005. Final reclamation would be completed approximately 2 to 3 years following the end of gas production.

A detailed description of design features, construction practices and water management strategies associated with the Proposed Action Alternative, can be found in the Master Surface Use Plan, Drilling Plan and Water Management Plan in the POD and individual APDs.

#### Additional Mitigating Measures

The following additional mitigating measures are part of Alternative C and would be included as conditions of approval with approved permits, if this alternative were selected (see Appendix G for the entire, Alternative C Additional Mitigating Measures). These mitigating measures would apply to the federal wells, facilities on federal leases for the development and production of such federal wells and facilities completed solely for the development and production of federal wells. As a result of inspections or monitoring, BLM can impose necessary mitigation measures that were not previously identified or rescind mitigation measures that are not necessary.

1. The operator shall notify BLM (406-232-7001) at least 48 hours before beginning construction activities associated with the sites listed below. BLM shall immediately notify the Northern Cheyenne Tribe about construction activities. The company shall have its consulting archaeologist or an archaeologist holding a valid BLM Cultural Resources Permit at the sites listed below during construction. The operator shall provide the opportunity to the Northern Cheyenne Tribe for a qualified cultural resources specialist to monitor construction in the locations listed below for the Federal portion of the Coal Creek Project Area. The results of monitoring shall be reported in writing by the Consulting Archaeologist and Tribe to BLM within 14 days after completion of monitoring activities. The purpose of the monitoring is to identify any cultural resources that may be discovered by construction activities. The archaeologist or cultural resources specialist may temporarily halt construction within

300 feet (100 meters) of the find until it can be evaluated by a BLM Cultural Resources Specialist. The operator shall immediately notify BLM (406-232-7001) upon the discovery of cultural resources. The BLM authorized officer shall respond to the operator within the five working days as per Condition of Approval No. 5. The same conditions in Condition of Approval No. 5 would apply for buried cultural resources encountered during monitoring.

2. Construction and drilling timing stipulation for grouse: No construction from March 1 to June 15 in grouse nesting habitat within two miles of an active lek for the following wells: 11-1991, 42-2091, 21-2191, 23-2191, 33-2191, 41-2191, 14-2291, 12-2791, 14-2791, 24-2891, 31-2891, 44-2891, 21-2991, 13-2991, 44-2991, 34-3091, 42-3091, 42-3191, 21-3291, 42-3291, 13-3391, 21-3391, 32-3391, 21-3491, 23-2490, 42-2490, and 44-2490, unless BLM grants an exception (see Appendix H).
3. Construction and drilling timing stipulation for crucial mule deer winter range: No construction from December 1 to March 31 within the boundaries of the crucial winter range would apply to the following wells: 41-2191 and 14-2291, unless BLM grants an exception (see Appendix H).
4. Construction and drilling timing stipulation for raptor nests active within the past two years: Construction and drilling activities are prohibited within 0.5 miles of a nest from March 1 to August 1, on the following wells: 42-2091, 14-2291, 12-2791, 21-2991, 42-3091, 42-2490, and 44-2490, unless BLM grants an exception (see Appendix H).

### **2.3 CUMULATIVE ACTIONS**

The MT FEIS analyzed long-term cumulative effects of CBNG activity throughout the region and disclosed the general types of effects to be considered in more detail during the review of site-specific CBNG proposals such as the Fidelity's Coal Creek POD. Cumulative effects are the result of impacts from other past, present, or reasonably foreseeable future actions that would overlap in time and locale with the direct effects of the proposed action or alternatives, thus resulting in "cumulative effects" distinctly different (greater or less) than the direct effects. The actions listed below have been considered as potential contributors (relevant) to

cumulative effects with the proposed project. A specific cumulative effects analysis for each resource is presented in Chapter 4 by alternative.

### 2.3.1 Relevant Past Actions

#### Coal Mines

- The *Decker Mine* is a surface coal mine owned jointly by the Kiewit Company and Kennecott Energy Company and operated by Decker Coal Company, a Kiewit subsidiary. The East Decker Mine is located immediately north of the Coal Creek project area. The mining method consists of open pit strip mining. Overburden and interburden are removed by draglines, shovels and trucks, front-end loaders and trucks or dozers. The permitted mine operations area is approximately 11,400 surface acres. The average annual coal production is 10 million short tons. The activities of the Decker Coal Mine, as well as its location in proximity to the Coal Creek POD, may cause cumulative effects to wildlife, water, air, cultural and aquatic resources. See Chapter 4, Environmental Consequences, for cumulative effects relating to each resource.
- The *Spring Creek Mine* is a surface coal mine owned and operated by Spring Creek Coal Company. The mine is located approximately 10 miles northwest of the Coal Creek project area. The mining method consists of open pit strip mining. Overburden and interburden are removed by draglines, shovels and trucks, front-end loaders and trucks or dozers. The permitted mine operations area is approximately 7,000 surface acres. The average annual coal production is 11 million short tons. The activities of the Spring Creek Coal Mine, as well as its location in proximity to the Coal Creek project, may cause cumulative effects to wildlife, air, and cultural resources. See Chapter 4, Environmental Consequences, for cumulative effects relating to each resource.
- The *Absaloka Mine* is a surface coal mine located on the Crow Reservation, owned and operated by Westmoreland Resources. The mine is located approximately 45 miles northwest of the Coal Creek POD area. The mining method consists of open pit strip mining. Overburden and interburden are removed by draglines, shovels and trucks, front-end loaders and trucks or dozers. The permitted mine operations area is approximately 5,500 surface acres. The average annual coal production is 6.8-8 million short tons. The scope and nature of the Absaloka Coal

Mine, as well as its location in proximity to the Coal Creek project area, may cause cumulative effects to air and migratory wildlife.

### 2.3.2 Relevant Present Actions

#### Gravel/Scoria Pits

Some gravel or scoria would be used to surface project area roads and would come from already permitted mineral material sites. Surface disturbance associated with gravel or scoria mining would not exceed existing permit limits. The activities associated with the gravel and scoria pits, as well as their locations in proximity to the Coal Creek project area, may cause cumulative effects to other resources. See Chapter 4, Environmental Consequences, for cumulative effects relating to each resource.

#### CBNG Development

According to the MBOGC website, June 29, 2004, approximately 495 CBNG wells have been drilled in Big Horn County; approximately 98 wells or less than 20% are Federal wells. Status of these wells includes drilling, shut-in, producing and plugged. Currently 456 CBNG wells, all in Big Horn County, are considered to be in production. This development is found in the CX Field, near Decker, Montana.

- Montana: The CX Field, including the Badger Hills and Dry Creek areas, is a CBNG producing field operated by Fidelity Exploration & Production Company. The field encompasses approximately 92.5 Sections between the Montana/Wyoming state line and the Decker and Spring Creek coal mines. As of November 18, 2004, MBOGC website demonstrates the CX Field has 456 producing wells, 3 being drilled and 16 shut in. The existing CBNG producing wells are located adjacent to the Coal Creek project area. The CBNG wells in the CX Field are finished in the Dietz 1, Dietz 2, Dietz 3, Monarch and Carney coal seams. The activities of the CX Field and its location in proximity to the Coal Creek project area may cause potential cumulative effects to wildlife, ground and surface water, air, cultural, mineral, vegetation and aquatic resources. See Chapter 4, Environmental Consequences, for cumulative effects relating to each resource.
- Powder River Gas (Coal Creek Project): Powder River Gas Company received approval on November 19, 2004, from BLM and MBOGC to drill and test 16 CBNG wells. This project area is approximately 6 miles north of the Coal Creek POD area. Powder River Gas has begun to drill 8 federal wells (on 4 well sites) and 8 private



wells (on 4 well sites). Upon successful completion of testing, Powder River Gas may propose a POD facility location. The activities of the Powder River Gas-Coal Creek project, as well as its proposed location in proximity to the Coal Creek project, may cause cumulative effects to wildlife, ground and surface water, air, cultural, mineral, vegetation and aquatic resources. See Chapter 4, Environmental Consequences, for cumulative effects relating to each resource.

- **Wyoming:** According to the WBOGC from 2002 to 2004, the Upper Tongue River Basin has been predicted to cumulatively have 1,474 wells

drilled and 48,241 acre feet of produced water (2002, 2003 and 2004, January to May, is actual data and 2004 from May on, is predicted). The cumulative water production is only 42.8% of the predicted amount (actual 20,626 acre feet compared to predicted 48,241 acres feet).

The BLM's Buffalo Field Office has received 6 CBNG PODs. The Lower Prairie Dog and Tongue River PODs have been approved and are in various stages or completion/production. The others are currently being processed. These include the following:

**Table 2.3-1 – Recent Wyoming BLM PODs**

POD Name	Operator	Sections	T N /R W	CBNG Wells	Water Management Plan
Lower Prairie Dog	J.M. Huber	4,8,9 &10	57 / 83	23 Approved	Containment and LAD
Tongue River	Fidelity	19, 24, 25, 30	58 / 83	23 Approved	Containment and LAD
Little Badger	J.M. Huber	25, 30, 31	58 / 82	30 Pending	Containment, LAD and Injection
Brinkerhoff	Pennaco	5, 6, 7, 8, 17, 18, 20, 21 & 28 12, 13 &24	57 / 82 57 / 83	27 Pending	Containment and LAD
Antelope Draw	Nance Petroleum	19, 20, 21, 28, 29, 31, 32, & 33	58 / 79	31 Pending	Containment
West Antelope Draw	Nance Petroleum	22, 23, 24, 25, 26, & 27	58 / 80	21 Pending	Containment

The Wyoming CBNG development and production, in the proximity to the Coal Creek POD, may have cumulative effects to air, cultural, wildlife and water resources. See Chapter 4, Environmental Consequences, for cumulative effects relating to each resource.

### 2.3.3 Reasonably Foreseeable Future Actions

The BLM 1985 Powder River RMP/EIS as amended by the MT FEIS contains Reasonably Foreseeable Development and Reasonable Foreseeable Future Actions scenarios. The scenarios prepared for the amendment estimated that approximately 26,000 federal CBNG wells would be drilled throughout the life of the plan (page MIN-29). The 210 proposed wells analyzed in this document are part of the

26,000 wells predicted in the MT FEIS.

The MT FEIS predicts that an additional 200 conventional oil and gas wells would be drilled in Big Horn County in the next 20 years.

Future CBNG drill sites would most likely be in proximity to established production, or would offset dry holes to improve interpretation of structural geology. Additional wells could be drilled and produced within the CX Field. MBOGC has established well spacing rules for the field that allow for four wells per coal seam per 160 acres, with the exception of Sections 26 and 35, T. 9 S., R. 40 E. and Sections 9, 10 and 20, T. 9 S. R. 41 E., which allows for 16 wells per coal seam per 640 acres.

It is also reasonably foreseeable that some wells would be plugged and abandoned, and that associated sites would be reclaimed. Based on the predicted 10 percent ratio of future well abandonment to future drilling, (MT FEIS page MIN-29), 21 of the proposed

Fidelity Coal Creek wells would be dry holes within 20 years, and would count toward the total of 2,600 anticipated dry holes statewide over the same time period.

### 2.3.3-1 Future rate of CBNG drilling

<b>RFD/RFFA area</b>	<b>Number of wells predicted in the next 20 years</b>	<b>Number of wells drilled to date</b>
Statewide	26,000 wells	509
County (BH, RB) area*	3,500-9,800 wells	495

\*BH = Big Horn, RB = Rosebud

#### Proposed Future CBNG development:

- **CX Field:** Additional wells could be drilled and produced within the CX Field. MBOGC has established well spacing rules for the field which allows for four wells per coal seam per 160 acres, with the exception of Sections 26 and 35, T. 9 S., R. 40 E. and Sections 9, 10 and 20, T. 9 S. R. 41 E., which allows for 16 wells per coal seam per 640 acres. Due to the scope and nature of this proposed project, and Coal Creek POD located in the CX Field expansion, cumulative impacts are likely to occur to wildlife, ground and surface water, air, cultural, mineral, vegetation and aquatic resources. See Chapter 4, Environmental Consequences, for cumulative effects relating to each resource.
- **Yates Petroleum Corporation:** Yates Petroleum has submitted applications to BLM for the drilling and testing of 14 wildcat CBNG wells scattered across an area from 5 miles north to 20 miles northeast of the producing CX Field. The proposal shows 1 well would be drilled at each well site, with 640 acre spacing. Due to the scope and nature of this proposed project, as well as the distance from the Coal Creek POD, no potential of cumulative impacts are likely to occur.
- **Powder River Gas (Coal Creek Project):** See the Powder River Gas-Coal Creek Project in the Relevant Present Actions, Section 2.3.2. For future analysis purposes, it is anticipated that an additional 28 wells (on 14 well sites) would be developed, based on an estimated 80-acre well spacing in the POD area. Produced gas would be marketed to a gas utility company's pipeline system. The activities of the Powder River Gas-Coal Creek project, as well as its proposed location in proximity to the Fidelity Coal Creek project, may cause cumulative effects to wildlife, ground and surface water, air, cultural, mineral,

vegetation and aquatic resources. See Chapter 4, Environmental Consequences, for cumulative effects relating to each resource.

#### Coal

Wolf Mountain Coal, Inc. proposes to build a stoker coal processing plant on private land for retail sales of stoker coal in Lot 1, Section 18, T. 8 S., R. 40 E.; BLM recently issued them a right-of-way (MTM93074) for a power line across federal surface in the NE¼SE¼, Section 13, T. 8 S., R. 39 E., to provide power to the proposed site. BLM has not reviewed a copy of the proposed project. Cumulative impacts are unknown at this time.

#### Tongue River Railroad

The Surface Transportation Board has published a Draft Supplemental Environmental Impact Statement for the Tongue River Railroad Company's (TRRC) proposed rail line construction in Rosebud and Big Horn Counties, Montana. The document analyzes the proposed 17.3 mile "Western Alignment" route, which had been preceded by two related applications that were considered and approved by the Board in 1986 and 1996, respectively. The proposed Western Alignment is an alternative route for the southernmost portion of the 41-mile Ashland to Decker alignment; known as the Four Mile Creek Alternative. The proposed Western Alignment bypasses the Four Mile Creek alignment, which is generally located from the Birney Road (Hwy 566) and the Tongue River Canyon junction, running west to Hwy 314, then south to the Decker Mine. The Western Alignment would continue south along the Tongue River on the ridge, but paralleling the river and ending around the Spring Creek Mine area. This proposed route would terminate approximately 10 miles north of the Coal Creek project area. Although the Coal Creek project is within 10 miles of the southern sections on the proposed TRRC Four Mile Creek and Western Alignment routes, the two projects would not be constructed simultaneously.

The Coal Creek project drilling and production infrastructure installation would be completed within approximately 5 months after project approval.

## **2.4 PREFERRED ALTERNATIVE IDENTIFICATION**

The BLM has identified *Alternative C, Fidelity's Proposed Plan of Development with Additional Mitigation Measures*, as its Preferred Alternative.

## **2.5 COMPARISON OF ALTERNATIVES**

Table 2.5-1 compares the major components of the three alternatives. Table 2.5-2 compares the major effects identified in Chapter 4 from each of the alternatives.

**Table 2.5-1 Fidelity Exploration & Production Company Coal Creek Project - Comparison of Alternatives**

<b>Project Component</b>	<b>Alternative A – No Action</b>	<b>Alternative B – No Federal Action</b>	<b>Alternative C – Proposed Action with Additional Mitigation (preferred alternative)</b>
<b><i>Well Drilling Activities:</i></b>			
Number and land status of CBNG wells in the Coal Creek Area	No approval would be received to any of the 210 proposed applications to drill.	62 new and 1 existing private CBNG wells on 13 private surface locations 16 new and 1 existing state CBNG wells on 4 locations	62 new and 1 existing private CBNG wells on 13 private surface locations. 16 new and 1 existing state CBNG wells on 4 locations 132 new and 2 existing federal wells on 28 locations
Drilling Actions	No drilling actions.	62 private CBNG wells would be drilled with portable, truck mounted, water well drilling rigs to depths of approximately 295 feet to 1,258 feet. Air and fresh water (including coal seam water) would be used in drilling, supplemented as needed by bentonite and sawdust or wood chips. Steel casing would be cemented in place from ground surface to the top of the target coal seam. The casing would be sized to accommodate a downhole pump to lift water, but would typically be seven inches in diameter. The well would then be drilled to the base of the target coal and under reamed to increase the exposed coal surface for production. A diverter would be installed to control uphole pressures and a minimum of three centralizers would be installed on the production casing spaced to protect shallow coals and aquifers. Anticipated drilling period to last approximately 2-3 months.	210 private, state, and federal CBNG wells would be drilled in the same manner as described in Alternative B. Anticipated drilling period to last approximately five months.
Disposal of wastes	No waste would be generated.	The 62 proposed private CBNG wells at 13 locations and 16 state wells at 4 locations would have a 15'L x 6'W x 15'D feet reserve pit for the disposal of drill cuttings, water, drilling mud and excess cement. The reserve pits would be fenced on three sides and the fourth would be fenced after the drilling rig has moved off of the	210 proposed private, state, and federal CBNG wells at 44 locations would be managed in the same manner as described in Alternative B.

Project Component	Alternative A – No Action	Alternative B – No Federal Action	Alternative C – Proposed Action with Additional Mitigation (preferred alternative)
		<p>location. Upon evaporation of fluids, pit closure occurs with the back fill of soil and its compaction to prevent settling. This would occur within 3-4 weeks after the drilling and completion of the well.</p> <p>Wastes would be contained onsite and disposed of at the Sheridan landfill.</p> <p>Chemical “porta-potties” would be used during active construction, drilling and battery sites.</p>	
<b><i>Production Support Facilities:</i></b>			
Field Battery Sites and Sales Battery Site (compressor sites)	<p>2 Existing Batteries: Montana State 36 Visborg 25</p> <p>1 Existing Sales Battery: Symons Central Compressor Station</p>	<p>2 Existing Batteries: Montana State 36 Visborg 25</p> <p>2 Proposed Batteries: Rancholme 21 Rancholme 29</p> <p>1 Existing Sales Battery: Symons Central Compressor Station</p>	<p>2 Existing Batteries: Montana State 36 Visborg 25</p> <p>3 Proposed Batteries: Rancholme 21 Rancholme 28 Rancholme 29</p> <p>1 Existing Sales Battery: Symons Central Compressor Station</p>
Gas & Water Pipelines & Electrical Lines	No construction	<p>Approximately 11.74 miles for private &amp; state, 15 feet corridor.</p> <p>Buried plastic flowline to carry gas from each well of the 78 proposed and 2 existing wells to the battery sites. Multiple flowlines would be placed in same trench. Trenches would parallel roads to extent feasible. Approximately .91 miles of buried power cable are located outside of a corridor.</p>	<p>Approximately 33.08 miles (21.34 miles for federal, 11.74 miles for private &amp; state, 15 feet corridor).</p> <p>Buried plastic flowline to carry gas from each well of the 210 proposed and 4 existing wells. Multiple flowlines would be placed in same trench. Trenches would parallel roads to extent feasible.</p> <p>Gas, water and electricity would be managed</p>

Project Component	Alternative A – No Action	Alternative B – No Federal Action	Alternative C – Proposed Action with Additional Mitigation (preferred alternative)
		<p>Produced water would be transported through buried plastic flowlines from each well site to the existing water management infrastructure.</p> <p>Electricity would be brought into the project area from 1.8 miles of existing line in the northern portion of the POD. All buried electrical cables would be installed inside of the road, gas and water corridors, except for .91 miles of buried cable, which are outside of a corridor. These underground lines would tie into aerial power lines at service taps. Electrical line totals: 9.38 miles overhead, 8.46 miles buried, 1.35 miles buried high voltage</p>	<p>as described in Alternative B, except that a total of 4.69 miles of buried electric line are located outside of road corridors. Electrical line totals: 12.35 miles overhead, 14.67 miles buried, 3.16 miles buried high voltage</p> <p>A BLM issued right-of-way would be required for any “off-lease” and/or third party facilities on Federal surface.</p>
<b>Access:</b>			
Road maintenance and use	Road maintenance and use would be that of the current situation.	<p>Access would primarily use roughly 13.34 miles of existing and proposed two track roads and 5.3 miles of proposed improved roads.</p> <p>Earthen materials would come from adjacent locations owned by the landowner. Scoria would be used when necessary from permitted shale pits for fill material.</p> <p>Estimated use of access would be 6 vehicles per day per well during the drilling and completion period.</p>	
<b>Produced Water Management:</b>			
Discharge of Produced Water to the Tongue River via MPDES Permit # MT-0030457	<p>No additional water would be produced or discharged.</p> <p>Discharge to Tongue River = <b>1,085</b> gpm</p>	<p>Additional water produced by 78 state and fee CBNG wells.</p> <p>Discharge to Tongue River = <b>1,124</b> gpm</p>	<p>Additional water produced by 210 state, fee and federal CBNG wells.</p> <p>Discharge to Tongue River = <b>1,600</b> gpm</p>
<b>Reclamation:</b>			

<b>Project Component</b>	<b>Alternative A – No Action</b>	<b>Alternative B – No Federal Action</b>	<b>Alternative C – Proposed Action with Additional Mitigation (preferred alternative)</b>
Reclamation Measures	No action would require no reclamation.	The surface would be reclaimed in accordance with the agreements with landowners. The disturbed areas would be seeded with a certified seed mix agreed to by the NRCS and the surface owner.	The surface would be reclaimed in accordance with the agreements with landowners. The disturbed areas would be seeded with a certified seed mix agreed to by the BLM, NRCS and the surface owner.
Reclamation Timeframes	No action would require no reclamation.	Reclamation would take place within 1 year where specific surface disturbing activities have been completed, and concurrent with other operations in the project area.	Same as Alternative B.
<b><i>Monitoring Plans:</i></b>			
Air Quality	No effects	Per MDEQ Requirements for testing to demonstrate compliance with emission limits and Annual Emission Inventories	Same as Alternative B.
Wildlife	None required	None required	Monitoring of specific wildlife species is required: <ul style="list-style-type: none"> <li>• Big game crucial winter range</li> <li>• Raptor nest success and productivity</li> <li>• Bald eagle winter roosts</li> <li>• Sage and sharp-tailed grouse activity</li> </ul>
Soils	None required	Sites would be monitored during various stages of development and reclamation to ensure erosion is limited	Same as Alternative B.
Water Quality	None required	Per MDEQ MPDES requirements	Same as Alternative B.

**Table 2.5-2 Fidelity Exploration & Production Company Coal Creek Project - Summary Comparison of Effects**

Affected Resource & Effect Indicators	Existing Resource Conditions	Alternative A – No Action	Alternative B – No Federal Action	Alternative C – Proposed Action with Additional Mitigation (preferred alternative)
<b><i>Air Quality:</i></b>				
Pollutant concentrations	<p>The area of the proposed project is currently classified as attainment/unclassified for the National Ambient Air Quality Standards. Therefore, the area is considered to be in compliance with ambient air quality standards.</p> <p>Existing criteria pollutant concentrations are in compliance with MAAQS and NAAQS, except for one violation of the 24 hour PM10 MAAQS in 2003 near Lame Deer in Rosebud County, Montana.</p>	<p>Resource conditions would remain the same because no emissions sources would be added.</p> <p>Concentrations of NO<sub>2</sub>, CO, SO<sub>2</sub> and PM<sub>10</sub> in compliance with MAAQS and NAAQS.</p> <p>Concentrations of NO<sub>2</sub> in compliance with PSD Class I at the Northern Cheyenne Reservation and in adjacent PSD Class II areas.</p>	<p>Same as Alternative A except, with Alternative B the highest pollutant emitted from drilling activities would be TSP/NO<sub>x</sub> (7.74 tons per year). The highest emissions from production would be from NO<sub>x</sub> and CO (195.58 and 318.16 tons per year). Actual emissions from the project would be well below the MAQP threshold, because (1) controlled emissions from Alternative B would exhibit good dispersion characteristics; (2) emissions would not exceed MDEQ permit thresholds; and (3) emissions would be temporary in nature. MDEQ determined that controlled emissions from the source would not cause or contribute to a violation of any ambient air quality standard.</p> <p>Refer to the emission inventory tables and the modeling analysis tables contained in Section 4.2.1</p>	<p>Same as Alternative A except, with Alternative C the highest pollutant emitted from drilling activities would be TSP (34.33 tons per year). The highest emissions from production would be from NO<sub>x</sub> and CO (211.8 and 350.62 tons per year). Actual emissions from the project would be well below the MAQP threshold, because (1) controlled emissions from Alternative C would exhibit good dispersion characteristics; (2) emissions would not exceed MDEQ permit thresholds; and (3) emissions would be temporary in nature. MDEQ determined that controlled emissions from the source would not cause or contribute to a violation of any ambient air quality standard.</p> <p>Refer to emission inventory tables and modeling analysis tables contained in Section 4.3.1</p>
Visibility	<p>Visibility monitoring data for Northern Cheyenne Reservation are not yet available.</p> <p>Recent visibility monitoring data for</p>	<p>Visibility in compliance with thresholds for mandatory federal Class I areas. Potential exceedances of voluntary visibility threshold at other sensitive locations from cumulative sources.</p>	<p>Same as Alternative A.</p>	<p>Same as Alternative A.</p>



<b>Affected Resource &amp; Effect Indicators</b>	<b>Existing Resource Conditions</b>	<b>Alternative A – No Action</b>	<b>Alternative B – No Federal Action</b>	<b>Alternative C – Proposed Action with Additional Mitigation (preferred alternative)</b>
	Yellowstone National Park show no worsening trend.			
Atmospheric Deposition	Existing atmospheric deposition monitoring at Little Big Horn Battlefield National Monument shows precipitation pH values are normal.	Atmospheric deposition in compliance with voluntary lake chemistry threshold in sensitive lakes.	Same as Alternative A.	Same as Alternative A.
<b><i>Cultural Resources:</i></b>				
National Register listed or eligible sites	No sites currently listed on the National Register exist within the POD area.	No sites eligible or listed on the National Register would be affected	Same as Alternative A.	Same as Alternative A.
Areas of traditional cultural value	No sites currently identified as areas of traditional cultural value exist within the POD area.	No impact to areas of traditional cultural value.	Same as Alternative A.	Same as Alternative A.
<b><i>Geology and Minerals:</i></b>				
CBNG Development	The target coal seams are the Dietz, Carney, & Monarch. The depths of these coals range from 295 feet to 1258 feet.	With no drilling and development on these private and federal leases, there would be no gas produced from leases. There would be no effect on the coal formations under the leases.	Under Alternative B only the private & state wells and would be drilled and produced.	Under the proposed action the wells would be drilled and completed for production. The life expectancy of these wells are estimated at 10 to 15 years.
<b><i>Hydrology:</i></b>				
<b><i>Water Quality Cumulative Impacts (Historical =Pre-CBNG):</i></b>				

<b>Affected Resource &amp; Effect Indicators</b>	<b>Existing Resource Conditions</b>	<b>Alternative A – No Action</b>	<b>Alternative B – No Federal Action</b>	<b>Alternative C – Proposed Action with Additional Mitigation (preferred alternative)</b>
<p>Maximum SAR at Birney Day School during LMM Flows</p> <p>Historical = 1.03 Current = 1.17</p> <p>MDEQ Std = 3.0 N. Ch. Std = 2.0</p>	<p><b>Foreseeable = 1.21</b></p> <p>SAR values would be 17.5% above historical and 3.4% above current values. SAR values are well below the water quality standards.</p>	<p><b>1.21</b></p> <p>There would be no change in SAR over foreseeable conditions. SAR levels would be 17.5% over historical values. SAR values would remain well below the water quality standards and all beneficial use support would be maintained.</p>	<p><b>1.22</b></p> <p>There would be a 0.8% increase in SAR over foreseeable conditions. SAR levels would be 18.4% over historical values. SAR values would remain well below the water quality standards and all beneficial use support would be maintained.</p>	<p><b>1.28</b></p> <p>There would be a 5.8% increase in SAR over foreseeable conditions. SAR levels would be 24.3% over historical values. SAR values would remain well below the water quality standards and all beneficial use support would be maintained.</p>
<p>Maximum EC at Birney Day School during LMM Flows</p> <p>Historical = 714 µS/cm Current = 726 µS/cm</p> <p>MDEQ Std = 1000 µS/cm N. Ch. Std = 1000 µS/cm</p>	<p><b>Foreseeable = 724 µS/cm</b></p> <p>EC values would be 1.4% above historical and 0.3% less than current values. EC values are well below the water quality standards.</p>	<p><b>724 µS/cm</b></p> <p>There would be no change in EC over foreseeable conditions. EC levels would be 1.4% over historical values. EC values would remain well below the water quality standards and all beneficial use support would be maintained.</p>	<p><b>725 µS/cm</b></p> <p>There would be a 0.1% increase in EC over foreseeable conditions. EC levels would be 1.5% over historical values. EC values would remain well below the water quality standards and all beneficial use support would be maintained.</p>	<p><b>730 µS/cm</b></p> <p>There would be a 0.8% increase in EC over foreseeable conditions. EC levels would be 2.2% over historical values. EC values would remain well below the water quality standards and all beneficial use support would be maintained.</p>
<p>Maximum SAR at Birney Day School during 7Q10 Flows</p> <p>Historical = 1.56 Current = 1.77</p> <p>MDEQ Std = 4.5 N. Ch. Std = 2.0</p>	<p><b>Foreseeable = 1.82</b></p> <p>SAR values would be 16.7% above historical and 2.8% above current values. SAR values are below the water quality standards.</p>	<p><b>1.82</b></p> <p>There would be no change in SAR over foreseeable conditions. SAR levels would be 16.7% over historical values. SAR values would remain below the water quality standards and all beneficial use support would be maintained.</p>	<p><b>1.83</b></p> <p>There would be a 0.5% increase in SAR over foreseeable conditions. SAR levels would be 17.3% over historical values. SAR values would remain below the water quality standards and all beneficial use support would be maintained.</p>	<p><b>1.92</b></p> <p>There would be a 5.5% increase in SAR over foreseeable conditions. SAR levels would be 23.1% over historical values. SAR values would remain below the water quality standards and all beneficial use support would be maintained.</p>

<b>Affected Resource &amp; Effect Indicators</b>	<b>Existing Resource Conditions</b>	<b>Alternative A – No Action</b>	<b>Alternative B – No Federal Action</b>	<b>Alternative C – Proposed Action with Additional Mitigation (preferred alternative)</b>
<p>Maximum EC at Birney Day School during 7Q10 Flows</p> <p>Historical = 1,111 µS/cm Current = 1,126 µS/cm</p> <p>MDEQ Std = 1500 µS/cm N. Ch. Std = 2000 µS/cm</p>	<p><b>Foreseeable = 1,112 µS/cm</b></p> <p>EC values would be 0.1% above historical and 1.2% less than current values. EC values are well below the water quality standards.</p>	<p><b>1,112 µS/cm</b></p> <p>There would be no change in EC over foreseeable conditions. EC levels would be 0.1% over historical values. EC values would remain well below the water quality standards and all beneficial use support would be maintained.</p>	<p><b>1,113 µS/cm</b></p> <p>There would be a 0.1% increase in EC over foreseeable conditions. EC levels would be 0.2% over historical values. EC values would remain well below the water quality standards and all beneficial use support would be maintained.</p>	<p><b>1,119 µS/cm</b></p> <p>There would be a 0.6% increase in EC over foreseeable conditions. EC levels would be 0.7% over historical values. EC values would remain well below the water quality standards and all beneficial use support would be maintained.</p>
<b><i>Water Quality Cumulative Impacts:</i></b>				
<p>Maximum SAR at Birney Day School during LMM Flows</p> <p>Historical (Pre-CBNG) = 1.03 Existing = 1.17</p> <p>MDEQ Std = 3.0 N. Ch. Std = 2.0</p>	<p><b>Foreseeable = 1.21</b></p> <p>SAR values are 17.5% above historical values. SAR values are well below the water quality standards.</p>	<p><b>1.21</b></p> <p>There would be no change in SAR over foreseeable conditions. SAR levels are 17.5% over historical values. SAR values would remain well below the water quality standards and all beneficial use support would be maintained.</p>	<p><b>1.22</b></p> <p>There would be a 0.8% increase in SAR over foreseeable conditions. SAR levels would be 18.4% over historical values. SAR values would remain well below the water quality standards and all beneficial use support would be maintained.</p>	<p><b>1.28</b></p> <p>There would be a 5.8% increase in SAR over foreseeable conditions. SAR levels would be 24.3% over historical values. SAR values would remain well below the water quality standards and all beneficial use support would be maintained.</p>
<p>Maximum EC at Birney Day School during LMM Flows</p> <p>Historical = 714 µS/cm Existing = 726 µS/cm</p> <p>MDEQ Std = 1000 µS/cm N. Ch. Std = 1000 µS/cm</p>	<p><b>Foreseeable = 724 µS/cm</b></p> <p>EC values are 1.4% above historical values. EC values are well below the water quality standards.</p>	<p><b>724 µS/cm</b></p> <p>There would be no change in EC over foreseeable conditions. EC levels are 1.4% over historical values. EC values would remain well below the water quality standards and all beneficial use support would be maintained.</p>	<p><b>725 µS/cm</b></p> <p>There would be a 0.1% increase in EC over foreseeable conditions. EC levels would be 1.5% over historical values. EC values would remain well below the water quality standards and all beneficial use support would be maintained.</p>	<p><b>730 µS/cm</b></p> <p>There would be a 0.8% increase in EC over foreseeable conditions. EC levels would be 2.2% over historical values. EC values would remain well below the water quality standards and all beneficial use support would be maintained.</p>

<b>Affected Resource &amp; Effect Indicators</b>	<b>Existing Resource Conditions</b>	<b>Alternative A – No Action</b>	<b>Alternative B – No Federal Action</b>	<b>Alternative C – Proposed Action with Additional Mitigation (preferred alternative)</b>
<p>Maximum SAR at Birney Day School during 7Q10 Flows</p> <p>Historical = 1.56 Existing = 1.77</p> <p>MDEQ Std = 4.5 N. Ch. Std = 2.0</p>	<p><b>Foreseeable = 1.82</b></p> <p>SAR values are 16.7% above historical values. SAR values are below the water quality standards.</p>	<p><b>1.82</b></p> <p>There would be no change in SAR over foreseeable conditions. SAR levels are 16.7% over historical values. SAR values would remain below the water quality standards and all beneficial use support would be maintained.</p>	<p><b>1.83</b></p> <p>There would be a 0.5% increase in SAR over foreseeable conditions. SAR levels would be 17.3% over historical values. SAR values would remain below the water quality standards and all beneficial use support would be maintained.</p>	<p><b>1.92</b></p> <p>There would be a 5.5% increase in SAR over foreseeable conditions. SAR levels would be 23.1% over historical values. SAR values would remain below the water quality standards and all beneficial use support would be maintained.</p>
<p>Maximum EC at Birney Day School during 7Q10 Flows</p> <p>Historical = 1111 µS/cm Existing = 1126 µS/cm</p> <p>MDEQ Std = 1500 µS/cm N. Ch. Std = 2000 µS/cm</p>	<p><b>Foreseeable = 1,112 µS/cm</b></p> <p>EC values are 0.1% above historical values. EC values are well below the water quality standards.</p>	<p><b>1,112 µS/cm</b></p> <p>There would be no change in EC over foreseeable conditions. EC levels are 0.1% over historical values. EC values would remain well below the water quality standards and all beneficial use support would be maintained.</p>	<p><b>1,113 µS/cm</b></p> <p>There would be a 0.1% increase in EC over foreseeable conditions. EC levels would be 0.2% over historical values. EC values would remain well below the water quality standards and all beneficial use support would be maintained.</p>	<p><b>1,119 µS/cm</b></p> <p>There would be a 0.6% increase in EC over foreseeable conditions. EC levels would be 0.7% over historical values. EC values would remain well below the water quality standards and all beneficial use support would be maintained.</p>
<b><i>Water Quantity Direct Impacts:</i></b>				
<p>Max total discharge rate to Tongue River (MPDES Permit # MT-0030457)</p> <p>Permitted Discharge = 1600 gpm</p>	<p><b>1085 gpm</b> (2.42 cfs)</p> <p>The current discharge rate is well below the permitted limit.</p>	<p><b>1085 gpm</b> (2.42 cfs)</p> <p>There would be no change in discharge rate, and discharge would continue to be well below the permitted limit.</p>	<p><b>1124 gpm</b> (2.94 cfs)</p> <p>There would be a 3.6% increase in discharge rate over existing conditions; however discharge would continue to be well below the permitted limit.</p>	<p><b>1600 gpm</b> (3.57 cfs)</p> <p>There would be a 47% increase in discharge rate over existing conditions and the discharge would be at the permitted limit.</p>
<p>Maximum Flow at Birney Day School during LMM Flow</p>	<p><b>175.42 cfs</b> (78,728 gpm)</p>	<p><b>175.42 cfs</b> (78,728 gpm)</p> <p>There would be no change in flow as a result of No Action.</p>	<p><b>175.51 cfs</b> (78,769 gpm)</p> <p>There would be a 0.05% increase in flow over existing conditions.</p>	<p><b>176.56 cfs</b> (79,240 gpm)</p> <p>There would be a 0.65% increase in flow over existing conditions.</p>

<b>Affected Resource &amp; Effect Indicators</b>	<b>Existing Resource Conditions</b>	<b>Alternative A – No Action</b>	<b>Alternative B – No Federal Action</b>	<b>Alternative C – Proposed Action with Additional Mitigation (preferred alternative)</b>
Area Contained within the Potential direct 20' Drawdown Contour from Coal Creek POD over 20 yrs	<b>0 mi<sup>2</sup></b>	<b>0 mi<sup>2</sup></b>  No drawdown would be added as a result of No Action.	<b>29.8 mi<sup>2</sup></b>  This area results from the extension of a 1.6 mile buffer from the edge of the No Federal Action well field (state and fee wells).	<b>38.8 mi<sup>2</sup></b>  The addition of the federal CBNG wells causes the area of drawdown to increase due to an increase in field size. Since the head at the edge of the field is the same (near the top of coal) the radius continues to extend 1.6 miles from the edge of the well field; however the well field is larger.
# of domestic or stock wells within the direct potential 20' drawdown area from the Coal Creek POD over 20 yrs	<b>0</b>	<b>0</b>  No additional wells would be added to the drawdown area as a result of No Action.	<b>11</b>  11 wells would be included in the 29.8 mi <sup>2</sup> drawdown area created. Only those wells that are completed in the developed coal seam will be affected by drawdown. Water mitigation agreements are anticipated to mitigate the effects of this drawdown.	<b>13</b>  The expansion of the drawdown area by 9.0 mi <sup>2</sup> will cause 2 additional wells to be included. Only those wells that are completed in the developed coal seam will be affected by drawdown. Water mitigation agreements are anticipated to mitigate the effects of this drawdown.
# of springs within the direct potential 20' drawdown area from the Coal Creek POD over 20 yrs	<b>0</b>	<b>0</b>  No additional springs would be added to the drawdown area as a result of No Action.	<b>1</b>  1 spring would be included in the 29.8 mi <sup>2</sup> drawdown area created. Only those springs which receive their water from the developed coal seam will be affected by drawdown. Water mitigation agreements are anticipated to mitigate the effects of this drawdown.	<b>1</b>  No Additional springs would be added to the drawdown area as a result of expanding the drawdown area by 9.0 mi <sup>2</sup> .

Affected Resource & Effect Indicators	Existing Resource Conditions	Alternative A – No Action	Alternative B – No Federal Action	Alternative C – Proposed Action with Additional Mitigation (preferred alternative)
<b><i>Water Quantity Cumulative Impacts (Historical = Pre-CBNG):</i></b>				
Max LMM Flow at Birney Day School  Historical = 173 cfs Current = 175.4 cfs	<b>Foreseeable = 181.71 cfs</b>  Flow values would be 5.0% above historical and 3.6% above current values.	<b>181.71 cfs</b>  There would be no change in Flow over foreseeable conditions. Flow levels would be 5.0% over historical values.	<b>181.80 cfs</b>  There would be a 0.05% increase in Flow over foreseeable conditions. Flow levels would be 5.1% over historical values.	<b>182.85 cfs</b>  There would be a 0.63% increase in Flow over foreseeable conditions. Flow levels would be 5.7% over historical values.
Area Contained within the Potential Cumulative 20' drawdown contour over 20 yrs  MT Current = 23.6mi <sup>2</sup> WY Current ~ 105.3 mi <sup>2</sup> Total Current ~ 128.9 mi <sup>2</sup>	<b>Foreseeable = 344.8 mi<sup>2</sup></b>  The existing level of development would be anticipated to cause coal seam groundwater levels to be drawn down over a large contiguous area over 20 years.	<b>344.8 mi<sup>2</sup></b>  No drawdown would be added as a result of No Action.	<b>352.2 mi<sup>2</sup></b>  The addition of the proposed state and fee CBNG wells cause the area that is drawn down within the coal seam aquifers by 20' or more to increase by 2.1% over foreseeable conditions.	<b>355.8 mi<sup>2</sup></b>  The addition of the proposed federal, state and fee CBNG wells cause the area that is drawn down within the coal seam aquifers by 20' or more to increase by 3.2% over foreseeable conditions.
# of domestic or stock wells within the cumulative potential 20' drawdown over 20 years  Current = 21 wells	<b>Foreseeable = 64 wells</b>	<b>64 wells</b>  No additional wells would be added to the projected drawdown area as a result of No Action.	<b>65 wells</b>  The expansion of the area drawdown by 7.4 mi <sup>2</sup> over the No Action Alternative causes one more to be added to the drawdown area.	<b>66 wells</b>  The expansion of the area drawdown by 3.6 mi <sup>2</sup> over the No Federal Action Alternative causes one well to be added to the drawdown area.
# of springs within the cumulative potential 20' drawdown contour  Current = 1 spring	<b>Foreseeable = 6 springs</b>	<b>6 springs</b>  No additional springs would be added to the projected drawdown area as a result of No Action.	<b>6 springs</b>  No additional springs would be added to the projected drawdown area as a result of No Federal Action.	<b>6 springs</b>  No additional springs would be added to the projected drawdown area as a result of the Proposed Action.

Affected Resource & Effect Indicators	Existing Resource Conditions	Alternative A – No Action	Alternative B – No Federal Action	Alternative C – Proposed Action with Additional Mitigation (preferred alternative)
<b><i>Indian Trust and Native American Concerns:</i></b>				
Indian Trust Assets	No Native American Trust Assets, land or leases are present in the Project Area.	There would be no impact to Indian Trust Assets.	Same as Alternative A. In addition, impacts to the concerns raised by the Northern Cheyenne Tribe would be addressed in the appropriate section of the EA. <ul style="list-style-type: none"> <li>• MAQP's protect NCT's Class I airshed values.</li> <li>• MPDES permit protects NCT's proposed water quality and standards.</li> </ul>	Same as Alternative B.
<b><i>Lands and Realty:</i></b>				
Rights-of-ways	There are three authorized Federal R/Ws in the POD area; a two-track unbladed access road in T. 9 S., R. 41E., Section 21; a Big Horn County Road and R./W; and Range Telephone Cooperative for a buried telephone line south along the County Road, both in Section 19, T. 9 S., R. 41 E.	No effects.	No effects.	Thirteen well sites would be located on Federal surface and BLM issued R/Ws would be required for the proposed "off-lease" and/or third party facilities on Federal surface.
<b><i>Livestock Grazing:</i></b>				

Affected Resource & Effect Indicators	Existing Resource Conditions	Alternative A – No Action	Alternative B – No Federal Action	Alternative C – Proposed Action with Additional Mitigation (preferred alternative)
Livestock Operations	Two livestock operations in the project area run approximately 200 cow/calf pair.	No impacts to livestock operations.	Produced water may create opportunities for additional water sources and livestock operations may benefit. During production, 10 animal unit months would remain unavailable to livestock operations.	Similar to Alternative B. During production, 25 animal unit months would remain unavailable to livestock operations.
<b><i>Social and Economic Conditions:</i></b>				
Federal production and Royalties	MBOGC report natural gas production in Big Horn county in 2002 was 9,679,910 MCF (DNRC Annual Review 2002, Page 19), approximately 11 percent of total statewide production. Oil & Gas production taxes contributed less than one-tenth of one percent of County revenues in FY 1999. The Minerals Management Service report Big Horn County Federal gas production of 258,209 MCF in FY2001, latest data available, with royalty payments of \$118,646.	No change from existing condition.	No change from existing condition.	<u>Average Annual Change:</u> <ul style="list-style-type: none"> <li>• 2.4 Billion Cubic Feet of natural gas.</li> <li>• \$1.2 Million dollars in federal royalties.</li> </ul>



Affected Resource & Effect Indicators	Existing Resource Conditions	Alternative A – No Action	Alternative B – No Federal Action	Alternative C – Proposed Action with Additional Mitigation (preferred alternative)
Environmental Justice	In 2000, 24% of the population living in Big Horn County and 17% of the population in Rosebud County had incomes below the poverty level. These figures compare to a state figure of 13% and reflect the relatively large numbers of persons on the reservations living in poverty.	No effects	No effects	No effect
<b>Soils:</b>				
Approximate acres of Disturbance:				
Roads: Two track (miles)	16.8 miles	0 miles	13.34 miles existing/new	32.22 miles existing/new
Improved (miles/acres)	0 miles/0 acres	0 miles/0 acres	5.3 miles/7.7 acres	5.3 miles/7.7 acres
Well Pads (before/after reclamation)			17 acres/4.25 acres	44 acres/11.25 acres
Corridors:	0 acres	0 acres	21.3 acres	60.1 acres
Gas Flowlines	0 acres	0 acres	0 acres outside corridors	0 acres outside corridors
Water Flowlines	0 acres	0 acres	0 acres outside corridors	0 acres outside corridors
Electric (aerial & buried)	0 acres	0 acres	1.7 acres outside corridors	8.5 acres outside corridors
Compressor Sites	4 acres	0 acres	4 acres	6 acres
Vegetative productivity on roads	800 lbs./acre for two-track roads 1400 lbs./acre undisturbed lands	800 lbs./acre for two-track roads 1400 lbs./acre undisturbed lands	100 lbs./acre for two-track roads 0 lbs./acre on improved roads	100 lbs./acre for two-track roads 0 lbs./acre on improved roads

Affected Resource & Effect Indicators	Existing Resource Conditions	Alternative A – No Action	Alternative B – No Federal Action	Alternative C – Proposed Action with Additional Mitigation (preferred alternative)
<b>Vegetation:</b>				
Montana Plant Species of Concern	No known Montana Plant species of concern in the project area.	No impacts to Montana Plant Species of Concern	Same as Alternative A.	Same as Alternative A.
<b>Wildlife:</b>				
Habitat fragmentation and disturbance in project area	Project area is currently fragmented by a county gravel road, powerline, several two-track trails, and large areas of sagebrush conversion to grassland.	No change from existing situation	Increased habitat fragmentation and disturbance from 78 wells, 5.3 miles of new all-weather roads, and 13.34 miles of two track roads.	Increased habitat fragmentation and disturbance from 210 wells, 5.3 miles of new all-weather roads, and 32.22 miles of two track roads.
Electrocution hazard level	Existing Aerial powerlines pose electrocution hazard.	No change from existing situation.	Increased electrocution hazard with 9.38 miles additional overhead power lines and power drops	Increased electrocution hazard with 12.35 miles additional overhead power lines and power drops
Proximity to T&E species habitat	Light disturbance to bald eagle nesting and winter roost habitat	No change from existing situation.	The CBNG development poses a potential disturbance to bald eagles, with one nest approximately 1.6 miles southwest from the project area	Same as Alternative B.